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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/628,058

07/25/2003

Mi-Suk Lee

2013P098

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08/23/2007

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EXAMINER

VO, HUYEN X

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

08/23/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/628,058

Applicant(s)

LEE ET AL.

Examiner

Huyen X. Vo

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7 and 8 is/are rejected.
- 7) ☒ Claim(s) 3 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 6/8/2007 have been fully considered but they are not persuasive.
2. With respect to applicant's arguments regarding rejection under 35 U.S.C. 101, examiner maintains previous ground of rejection. The final pitch estimation resulted from a series of mathematical operations is represented by numerical data or vector, which is not considered a useful, concrete, and tangible result. In order for the final pitch estimation to be a useful, concrete, and tangible result, the pitch estimation represented by numerical data or vector must be converted into real signal (signal transformation). Since there is no indication of signal transformation from numerical data or vector into real signal.
3. Regarding claim 8, claim amendment should be consistent with the specification. The term "A machine readable storage medium" in claim 8 should be amended to "A machine usable medium".
4. Applicant's arguments with respect to claims and 4 have been considered but are moot in view of the new ground(s) of rejection in view of Suzuki et al. (US 6594626) necessitated by claim amendment.

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-8 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

7. Claims 1-8 are drawn to a device of a speech CODEC which estimates a pitch of an input speech signal. In order for a claimed invention to be considered statutory under 35 U.S.C. 101, it must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result" (*State Street*, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02). In the present case, the final result of claims 1 and 4-5 only refer to processing and analyzing the input speech signal to determine a candidate pitch (see the claims). As such, claims 1-5 are directed to non-statutory subject matter. The dependent claims fail to overcome the 35 U.S.C. 101 rejection directed towards independent claims 1 and 4, and thus, are also directed to non-statutory subject matter.

8. Claims 1-8 are drawn to a mathematical algorithm, per se. Claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are non-statutory. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing all of the foregoing, the acts are not being applied to appropriate subject matter. *Schrader*, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations without some

claimed practical application is drawn to non-statutory subject matter. In this case, the claims merely recite the steps of calculating, estimating, and deciding, without any practical application being recited.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-2, 4-5, and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Ehara (US 6804639) in view of Suzuki et al. (US 6594626).

11. Regarding claims 1 and 4, Ehara discloses an open-loop pitch estimation device of a speech CODEC which estimates a pitch of an input speech signal, the device comprising:

an autocorrelation function calculation unit which calculates a normalized autocorrelation function from a perceptual weighing filtered speech signal (*element 201 in figure 4*);

a maximum autocorrelation function and a lag estimation unit which receives the autocorrelation function and estimates a maximum autocorrelation function, a lag having

the maximum autocorrelation function, candidates for the maximum autocorrelation function and lags corresponding to the candidates for the maximum autocorrelation function (*col. 18, lines 22-67*);

a pitch candidate decision unit which decides a candidate for a pitch by using the ratio of the estimated maximum autocorrelation function to the candidates for the estimated maximum autocorrelation function, and the ratio of the lags having the estimated maximum autocorrelation function to the lags corresponding to the candidates for the estimated maximum autocorrelation function (*col. 18, lines 22-67, maximum auto-correlation candidates are determined. The maximum candidates among these maximum candidates is used in calculating the threshold value*); and

a pitch estimation unit which estimates a pitch between the candidate for a pitch and the lag corresponding to the estimated maximum autocorrelation function by using a pitch of a previous frame of the speech signal (*col. 12, lines 35-48*).

Ehara fails to specifically disclose that a lag smaller than a predetermined threshold as the candidate for a pitch. However, Suzuki et al. teach that a lag smaller than a predetermined threshold as the candidate for a pitch (*col. 16, lines 27-41*).

Since Ehara and Suzuki et al. are analogous because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Ehara by incorporating the teaching of Suzuki et al. in order to improve pitch estimation accuracy.

12. Regarding claims 2 and 5, Ehara further discloses the device of claim 1, wherein the maximum autocorrelation function and lag estimation unit estimates the maximum autocorrelation function among the normalized autocorrelation functions and determines maximum autocorrelation functions prior to the estimated maximum autocorrelation function as the candidate for the maximum autocorrelation function (*col. 18, lines 22-67, normalized auto-correlation*).

13. Regarding claim 7, Ehara further discloses the method of claim 5, wherein step (d) is characterized by estimating a lag that is nearest to the pitch of the previous frame among candidates for a pitch by using the pitch of the previous frame (*col. 12, lines 35-48*).

***Allowable Subject Matter***

14. Claims 3 and 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is an examiner's statement of reasons for allowance: Ehara fails to specifically disclose wherein the pitch estimation unit calculates  $K(d.sub.x)$  for the candidates for the estimated maximum autocorrelation function by a formula  $K(d.sub.x) = a K.sub.log(d.sub.x) + (1-a)K.sub.corr(d.s-ub.x)$ ,  $x=1, 2, 3, \dots, l$  and estimates a lag that is nearest to the pitch of the previous frame between a lag having  $K(d.sub.x)$  that is smaller than a predetermined threshold and the lag having the maximum autocorrelation function, wherein  $a$  denotes a predetermined

weight,  $K_{\text{sub}} \log(d_{\text{sub}} x)$  is calculated by a formula  $K_{\text{sub}} \log(d_{\text{sub}} x) = \frac{1}{L} \left[ \frac{d_{\text{sub}} x}{d_{\text{sub}} x + 0.5} - \frac{d_{\text{sub}} \max}{d_{\text{sub}} x} \right]$ ,  $L$  denotes the number of the candidate for the maximum autocorrelation function prior to the estimated maximum autocorrelation function,  $d_{\text{sub}} x$  denotes a lag of the candidate for the maximum autocorrelation function, and  $K_{\text{sub}} \text{corr}(d_{\text{sub}} x)$  is calculated by a formula  $K_{\text{sub}} \text{corr}(d_{\text{sub}} x) = \frac{1}{L} \left[ \frac{1}{R(d_{\text{sub}} \max)} - \frac{1}{R(d_{\text{sub}} x)} \right]$ .

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen X. Vo whose telephone number is 571-272-7631. The examiner can normally be reached on M-F, 9-5:30.

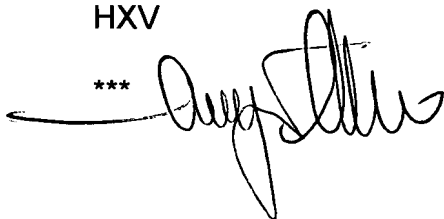
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HXV

8/13/2007

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A handwritten signature in black ink, appearing to read 'Huyen X. Vo', with a long horizontal line extending to the left.